LISTING OF CLAIMS

1. (Currently Amended) A method for checking the position of a mechanical part [[(2)]] along at least one checking direction [[(X)]] by means of an apparatus [[(1)]] including a device [[(6)]] for generating a light beam [[(7)]] along a trajectory [[(Y)]] transverse[[al]] to said at least one checking direction [[(X)]], a sensor [[(8)]] for detecting the interruption of the light beam [[(7)]], and devices [[(3)]] for causing [[mutual]] relative displacements between the mechanical part [[(2)]] and the light beam [[(7)]] along said at least one checking direction [[(X)]] and along an inspection direction [[(Z)]] transverse[[al]] to the at least one checking direction [[(X)]], the method [[including the following steps]] comprising:

[[•]] identifying [[(19)]] a first linear interval [[(X1)]] and a second linear interval [[(Z1) of the mutual]] related to relative positions between the mechanical part [[(2)]] and the light beam [[(7)]] along the at least one checking direction [[(X)]] and[[, respectively,]] the inspection direction [[(Z)]], respectively, said first linear interval [[(X1)]] and said second linear interval [[(Z1)]] defining a checking area [[(13)]] of the mechanical part [[(2),]];

[[•]] controlling a sequence of checking displacements between the mechanical part [[(2)]] and the light beam [[(7)]], including:

[[•]] controlling displacements [[(29)]] for bringing the light beam [[(7)]] to inspection positions [[(Pi;P1-P4) of]] along the first linear interval [[(X1),]]; and

[[• at said inspection positions (Pi;P1-P4),]] controlling linear inspection movements [[(30)]] at said inspection positions along said inspection direction [[(Z),]];

[[•]] detecting [[(31-34)]] the interruption or the non-interruption of the light beam [[(7)]] in the course of said linear inspection movements along the inspection direction [[(Z)]], and consequently selecting [[(35,36,38) the]] a subsequent of said

inspection positions [[(Pi;P1-P4) of]] along the first linear interval [[(X1)]] at which [[the]] subsequent linear inspection movements are controlled[[,]];

[[•]] stopping [[(37)]] the sequence of checking displacements at a final inspection position [[(PN)]] of the light beam [[(7) in]] along the first linear interval [[(X1) that]], wherein said final inspection position lies at a distance [[(D)]] less than a preset value [[(W)]] from a previous inspection position [[(Pi;P1-P4)]], and wherein[[,]] in the course of linear inspection movements at said final inspection position [[(PN)]] and said previous inspection position [[(Pi;P1-P4) in the first linear interval (X1)]], there have been detected[[, respectively,]] the interruption [[(32,34)]] and the non-interruption [[(31,33)]] of the light beam [[(7)]], respectively, or vice versa[[,]]; and

[[•]] identifying [[(41)]] the position of the mechanical part [[(2)]] along the at least one checking direction [[(X)]] on the basis of said final inspection position [[(PN)]].

2. (Currently Amended) The method according to claim 1, wherein said inspection positions [[(Pi;P1-P4) of]] along the first linear interval [[(X1)]] are selected at distances [[(D)]] progressively decreasing from each other according to a convergent sequence.

3. (Currently Amended) The method according to claim 2, wherein said inspection positions [[(Pi;P1-P4) of]] along the first linear interval [[(X1)]] are selected at distances [[(D)]] progressively halved from each other.

4. (Currently Amended) The method according to claim 2 [[or claim 3]], wherein said displacements [[(29)]] for bringing the light beam [[(7)]] to inspection positions [[(Pi;P1-P4) of]] along the first linear interval [[(X1)]] are controlled in a first orientation [[sense (V)]] or in [[the]] a second, opposite [[sense]] orientation

along said at least one checking direction [[(X)]] as a consequence [[(35)]] of the detecting of the interruption [[(32,34)]] or the non-interruption [[(31,33)]] of the light beam [[(7)]] in the course of the linear inspection movements at [[the]] two most recent inspection positions [[(Pi;P1-P4)]].

5. (Currently Amended) The method according to [[one of the preceding claims]] claim 1, including a preliminary verification phase of said checking area [[(13)]] with displacements between the light beam [[(7)]] and the mechanical part [[(2)]] between predetermined points [[(14,15,16,17)]] of the checking area [[(13)]].

6. (Currently Amended) The method according to claim 5, wherein said preliminary verification phase includes at least one of said linear inspection movements along the inspection direction [[(Z)]].

7. (Currently Amended) The method according to [[one of the preceding claims]] claim 1, wherein said linear inspection movements along said inspection direction [[(Z)]] are interrupted as soon as the interruption of the light beam [[(7)]] is detected [[(32)]].

8. (Currently Amended) The method according to [[one of the preceding claims]] claim 1, wherein [[the]] trajectory [[(Y)]] of said light beam [[(7)]] and said checking area [[(13)]] are substantially perpendicular.

9. (Currently Amended) The method according to [[one of the preceding claims]] claim 1, wherein in the step of stopping [[(37)]] the sequence of the checking displacements, said previous inspection position [[(Pi;P1-P4)]] is the immediately preceding position with respect to the final inspection position [[(PN)]].

10. (Currently Amended) The method according to [[one of the preceding claims]] claim 1, wherein said light beam is a laser beam [[(7)]].

11. (Currently Amended) A method for checking the position of a mechanical part [[(2)]] along [[at least]] one checking direction [[(X)]] by means of an apparatus [[(1)]] including a device [[(6)]] for generating a light beam [[(7)]] along a trajectory [[(Y)]] transverse[[al]] to said checking direction [[(X)]], a sensor [[(8)]] for detecting the interruption of the light beam [[(7)]], and devices [[(3)]] for causing [[mutual]] relative displacements between the mechanical part [[(2)]] and the light beam [[(7)]] along said checking direction [[(X)]] and along an inspection direction [[(Z)]] transverse[[al]] to said checking direction [[(X)]], the method [[including the following steps]] comprising:

[[•]] identifying [[(19)]] a first linear interval [[(X1)]] and a second linear interval [[(Z1) of the]] related to [[mutual]] relative positions between the mechanical part [[(2)]] and the light beam [[(7)]] along the checking direction [[(X)]] and[[, respectively,]] the inspection direction [[(Z)]], respectively, said first linear interval [[(X1)]] and said second linear interval [[(Z1)]] defining a checking area [[(13)]] of the mechanical part [[(2),]];

[[•]] controlling [[the following]] a sequence of checking displacements between the mechanical part [[(2)]] and the light beam [[(7)]], the sequence comprising:

(a) a linear inspection movement [[(30)]] along said inspection direction [[(Z)]] within the checking area [[(13)]], till there occurs one of the following events:

(i) interruption [[(32,34)]] of the light beam [[(7), or]]; and

(ii) [[covering (31,33) of]] relative displacement along the entire second linear interval [[(Z1)]] with no interruptions of the light beam [[(7),]];

(b) a displacement[[(29)]] along the checking direction [[(X)]], in a determined first orientation [[sense (V)]], up to an inspection position [[(Pi;P1-P4)]] of the light beam [[(7)]] in said first linear interval [[(X1),]];

(c) [[the]] repetition of the linear inspection movement [[(30)]] along the inspection direction [[(Z)]] according to step (a)[[,]];

(d) a [[fresh]] new displacement [[(29)]] along the checking direction [[(X)]] in the first orientation [[sense (V) of the previous displacement]], or in [[the]] a second, opposite orientation [[sense]], the orientation being determined according to [[(35)]] whether [[the]] event (i) or (ii) that occurred [[(31-34)]] in the most recent linear inspection movement [[(30) be or not be]] was the same as that occurred in the previous linear inspection movement [[(30)]], said new displacement extending up to a [[fresh]] new inspection position [[(Pi;P1-P4)]] of the light beam [[(7) in]] along said first linear interval [[(X1)]], at a known distance [[(D)]] with respect to the immediately previous inspection position [[(Pi;P1-P4),]];

(e) [[the]] repetition of [[linear inspection]] movements and displacements, according to steps (c) and (d) - with progressively decreasing distances [[(D)]] between [[the fresh]] new inspection positions [[(Pi;P1- P4)]] and the immediately previous inspection positions [[(Pi;P1- P4)]] of the light beam [[(7)]] in said first linear interval [[(X1)]] - till [[(35,37)]] the distance [[(D)]] between [[the fresh]] inspection position [[(Pi,PN;P1-P4)]] and a previous inspection position [[(Pi;P1- P4) - at which the linear inspection movement causes the occurring of one of the events (i) and (ii) and, respectively, the opposite event -]] is less than a prefixed value [[(W),]]; and

[[•]] identifying [[(41)]] the position of the mechanical part [[(2)]] along the checking direction [[(X)]] on the basis of the [[fresh]] new inspection position [[(PN)]] of

the light beam [[(7)]] in said first linear interval [[(X1)]] at the end of the sequence of checking displacements.

12. (Currently Amended) The method according to [[one of the preceding claims]] claim 1, for checking the position of a working area [[(11,12)]] of a tool [[(2)]] coupled to [[the]] a turret [[(3)]] of a machine tool [[(4)]].

13. (Canceled).

14. (New) A system for checking the position of a working area of a tool, coupled to a turret of a machine tool, along at least one checking direction, comprising:

a device for generating a light beam along a trajectory transverse to said at least one checking direction;

a sensor for detecting interruption of the light beam;

devices for causing relative displacements between the tool and the light beam along said at least one checking direction and along an inspection direction transverse to the at least one checking direction; and

a control unit that is adapted to perform the following steps:

controlling a sequence of checking displacements between said tool and said light beam, including displacements for bringing the light beam to inspection positions along said at least one checking direction, and, at said inspection positions, linear inspection movements along said inspection direction;

detecting the interruption or the non-interruption of the light beam in the course of said linear inspection movements along the inspection direction, and consequently selecting a subsequent inspection position at which a subsequent linear inspection movement is performed;

stopping the sequence of checking displacements at a final inspection position of the light beam along said at least one checking direction that lies at a distance less than a preset value from a previous inspection position, where, in the course of linear inspection movements at said final inspection position and said previous inspection position, there have been detected he interruption and the non-interruption of the light beam, respectively, or vice versa, and

identifying the position of the tool along the checking direction on the basis of said final inspection position.